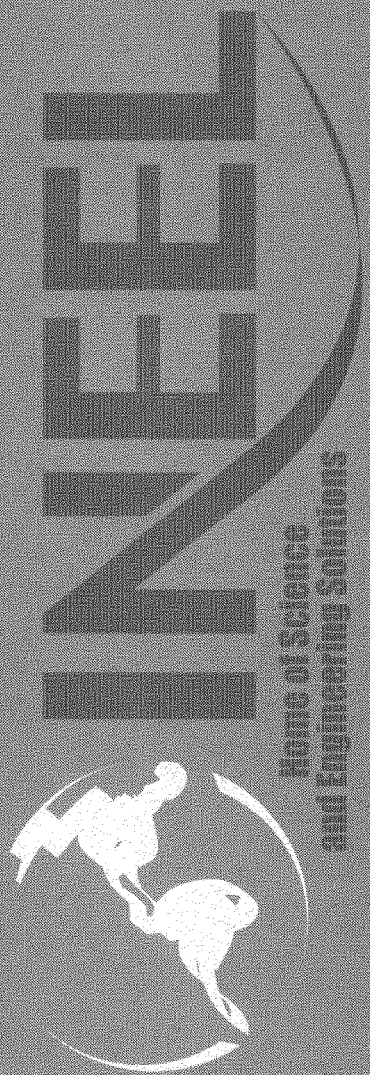
INEEL/EXT-02-01165
Revision 0

Conceptual Design for V-Tank Isolation and Sand Filter Removal for WAG 1, OU 1-10

November 2002



Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

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November 2002

Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

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Assistant Secretary for Environmental Management
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ABSTRACT

This document constitutes the conceptual design for the isolation of the V-tank piping and removal of the sand filter. The sand filter is located at ground level in close proximity to the V-tanks. The isolation of the piping from the V-tanks, as well as removal of the sand filter, has been identified as an early remediation activity in preparation for the main remediation activity of processing and disposal of the V-tanks.

The overall objectives for this project are as follows:

- Isolating piping from TAN tanks V-1, V-2, V-3, and V-9
- Removal of piping where feasible
- Removal of the sand filter.

The design ideas presented in this Conceptual Design Report (CDR) establish the general overall direction this project will take to accomplish the above-mentioned objectives. This document establishes a basis for project direction, initial cost estimating, and project scheduling. Design details will be presented in title design.

CONTENTS

FIGURES

ACRONYMS

AOC	area of contamination
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho National Engineering and Environmental Laboratory
TAN	Test Area North
VOC	volatile organic compound
WAG	Waste Area Group

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1. INTRODUCTION

This conceptual design identifies the logical method for isolating identified lines crossing the area of contamination (AOC) boundary and the lines connecting tank V-9 to Test Area North (TAN)-616 and TAN-616 to tanks V-1, V-2, and V-3. Prior to isolation the lines between tank V-9 and tanks V-1, V-2, and V-3 will be inspected and, if necessary, flushed to remove any freestanding contamination that may be in the pipes. All lines will then be isolated and capped. A sand filter is located aboveground between tanks V-9 and V-1 and has already been isolated. This filter will be removed and disposed of as part of this operation.

Any excavation will be limited to the boundary of the AOC wherever possible. The reason for this is to avoid contact with the V-tanks and possible puncturing and spillage of the tank's contents. After isolation and capping is complete, all trenches will be back-filled for safety concerns.

1.1 Background

The remediation site addressed in this document is situated in an open area east of TAN-616 and north of TAN-607 (Figure 1). Waste from the TAN-616 evaporator pit sump and pump room sump, the TAN-607 Warm/Hot Shop drains, and Valve Pit #2 was transferred through the TAN-1704 valve pit (Valve Pit #1) to Tank V-9. The overflow from Tank V-9 drained to Tanks V-1, V-2, and V-3 (DOE-ID 2001). Tanks V-1, V-2, and V-3 are 10,000 gal underground storage tanks. They were installed in 1953 and became operational in 1958. The tanks were designed to collect and store liquid radioactive waste at TAN. The waste was stored in the underground tanks then treated in the evaporator system located in TAN-616. In 1972, the TAN-616 evaporator system failed and all wastes were directed to the PM-2A tanks (DOE-ID 1997). Tanks V-1 and V-3 became inactive in the early 1980s. Tank V-2 was taken out of service in 1968. Additional wastewater was reportedly added to Tank V-3 through 1985. Starting in 1986, all low-level radioactive waste at TAN was rerouted to TAN-666 through a piping modification in the TAN-1704 valve pit. The piping modification stopped intentional discharge to the V-Tanks in 1985.

Based on the 1993 Track 2 investigation and the 1996 RI/FS sampling results, the potential contaminants of concern for the drain lines and tanks are metals (e.g., mercury, chromium, and lead), volatile organic compounds (VOCs) (e.g., tetrachloroethene and trichloroethene), semivolatile organic compounds (e.g., polychlorinated biphenyls), and radionuclides (e.g., Cs-137, Co-60, Sr-90, and various isotopes of plutonium and uranium) (DOE-ID 1997; INEL 1994).

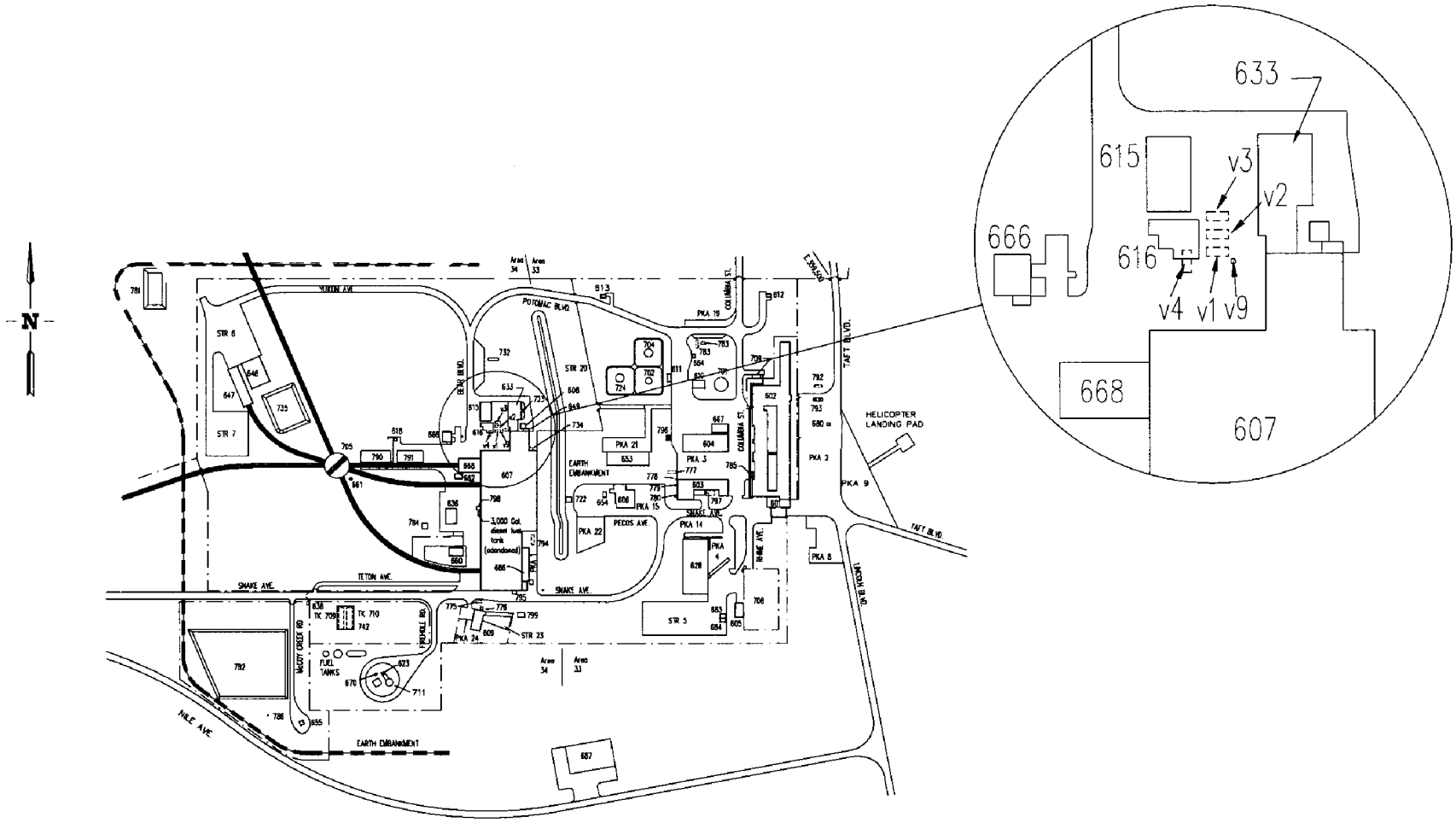

Figure 1. Test Area North area map.

2. DESIGN SCOPE AND DESCRIPTION

The purpose of this design is to inspect and flush, if necessary, the lines between Tank V-9 and Tanks V-1, V-2, and V-3, and to cut and cap all non-Voluntary Consent Order lines found within this AOC. We will also be isolating the valve box (TAN-1704) from Tank V-9. The sand filter, located above ground between Tanks V-9 and V-1, will be removed and disposed. See figure 3 for illustration of piping involved.

The activities defined in this project are dependent on the successful change of the Safety Analysis Report (SAR). The SAR (INEL-94/0163) change is currently in process and is expected to be completed in time for execution of this project.

3. EXCAVATION

During excavation, care will be taken in locating lines, moving soil, shoring, and backfilling. These activities are discussed below.

3.1 Locating Lines

The location of all lines falling within the scope of this project will be identified using existing drawings as much as possible and individual expertise when available. A subsurface investigation will be performed to assist in locating piping and will follow program requirements document (PRD)-22. In some areas it may be necessary to probe for pipe locations.

3.2 Moving Soil

Equipment will be used to remove the majority of the soil except where clearances are too small to safely operate. In these areas, and when the excavation has come to within 12 inches of all other lines, manual removal shall be used. All excavated soil shall be piled inside the AOC near the trenches it came from to be used later for backfill.

3.3 Shoring

Excavations greater than 4 ft in depth shall be shored with trench boxes, trench shields, or have sides of excavation sloped so they do not exceed a 1½:1 height to vertical ratio.

3.4 Backfilling

Upon completing the cutting and capping, the trenches dug to facilitate this activity shall be backfilled to await the remedial action planned for the V-tanks and associated piping. This is to minimize safety concerns within the AOC.

4. INSPECTION

Two forms of inspection shall be performed: remote and visual. These are discussed below.

4.1 Remote

A fiber-optic camera will be inserted into the line running from V-9 into TAN-616, the header inside TAN-616, and the drain lines from the header to tanks V-1, V-2, and V3 through an access port inside TAN-616. The inside of the lines will be inspected for liquid pooled in the pipes and for the amount and type of either solid or loose. If the inspection identifies no need for flushing, Section 4 can be omitted.

4.2 Visual

Whether lines are flushed or not, a visual inspection shall be performed when each line is cut. Each pipe will be visually inspected to confirm the absence of potentially hazardous material.

5. FLUSHING

If flushing is deemed necessary, the following actions will be taken.

5.1 Isolating V-9

Tank V-9 must be isolated from the 6-in. line running between V-9 and TAN-616 to prevent contaminants in V-9 being flushed through the lines and into the other V-tanks. The line will be cut and capped next to V-9 and a connection installed to allow water to be introduced to the line. The two incoming lines from the valve box (TAN-1704) will also be isolated from V-9. Since these lines are short (< 3 ft), they will both be cut and capped near V-9 and the valve box and the pipe sections between the cuts removed.

5.2 Identifying and Flushing Lines

The lines identified for possible flushing are a set of four 104-A2-6-in. lines (Figure 2). One line runs between Tank V-9 and Building TAN-616. This connects to a header arrangement with valves that direct the liquid to Tanks V-1, V-2, or V-3. Subsequently, each 104-A2-6-in. line, identified by inspection of having contaminants, will need to be flushed.

The line from V-9 will be used to flush all 104-A2-6-in. lines going to the V-tanks. Water, from a nearby fire hydrant or tanker (if hydrant is not available), will be forced into the line running from V-9 to TAN-616. Utilizing the valves inside TAN-616, the water coming in from the V-9 line will be directed through whichever V-1, V-2, and V-3 lines are identified as needing to be flushed until it is determined the affected lines have been cleaned sufficiently.

Because flushing would require introducing additional water to the tanks, the amount of water used must be held to a minimum (i.e. <100 gallons per tank). Also, taking into consideration the current level of liquid in tank V-3, the liquid in V-3 will be decanted before any flushing activity occurs. The introduction of liquid into any of the V-tanks will not invalidate past samples but will be used to calculate the dilution caused by the additional water.

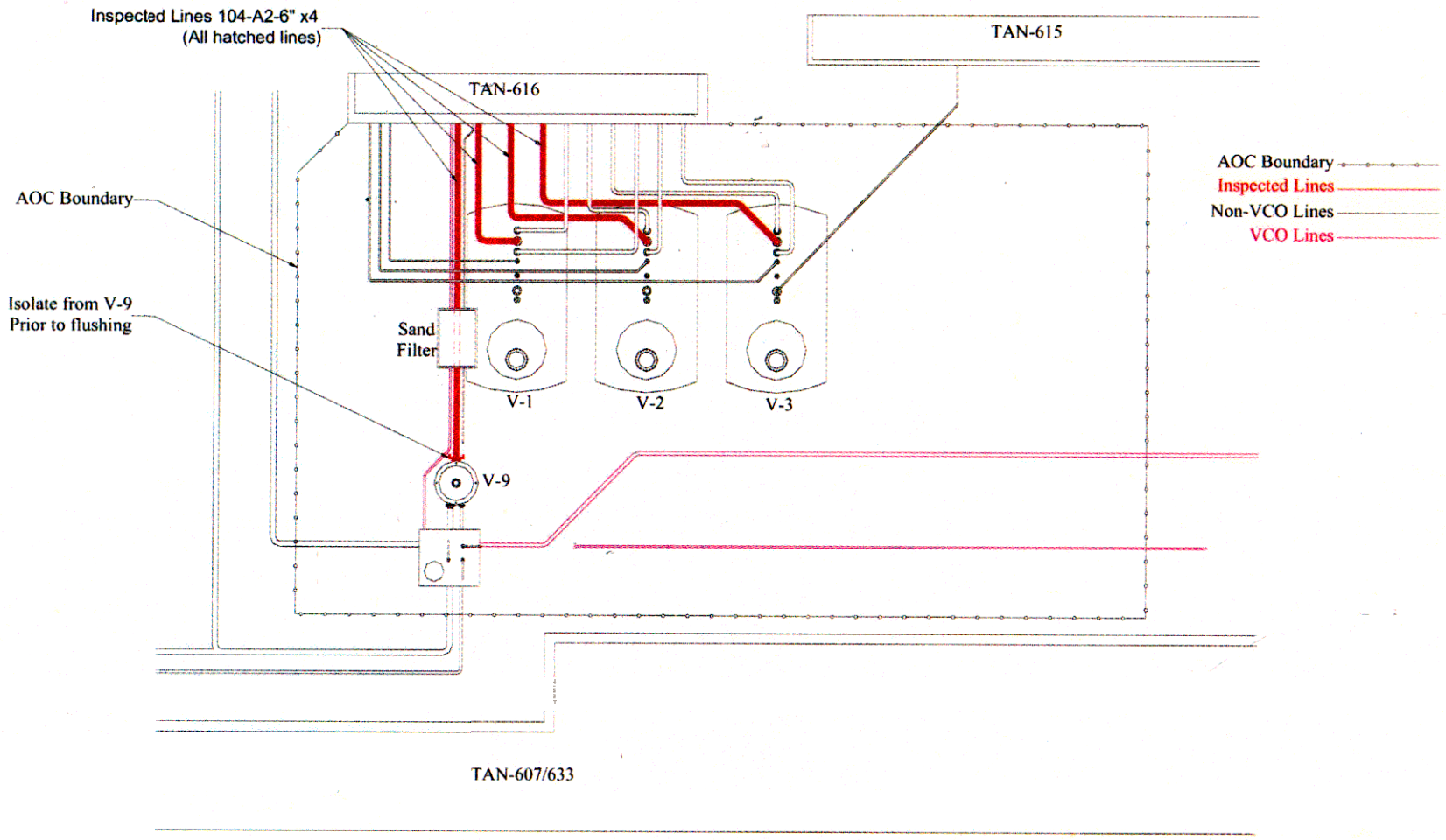

Figure 2. Inspection lines.

NOTE: *Flushing the lines is based on the assumption that contaminants are present in the lines at a level high enough to pose unacceptable risk to workers and the environment if released. A video inspection will be conducted to verify the presence of contaminants. If the inspection shows that the lines are clear, then the flushing procedure will not be done.*

6. CUTTING AND CAPPING

The cutting and capping of the lines in the AOC include VCO lines as well as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) lines. The V-Tank and TAN-616 VCO projects are working together in these efforts. This was decided to be the best path forward so that tasks from both projects can be consolidated and optimized to reduce overall costs and schedules. The cutting/capping of CERCLA lines will be funded from the WAG 1 OU 1-10 V-Tank project. The cutting/capping of the VCO lines will be funded from the TAN-616 VCO project. In order to cut and cap the pipe, certain actions will be followed. These are described below.

6.1 Location

All lines crossing the AOC boundary shall be cut approximately 6 in. inside the AOC boundary (with the exception of the VOC lines which do not fall under the scope of this project) as shown in Figure 3. In an effort to minimize airborne contamination caused by cutting the pipes, foam shall be injected into the pipes in the area of the cut. This will seal off the ends of the pipes allowing workers to cut and cap the pipe ends without the concern of serious contamination.

6.2 Foaming

Three 1/4-in. holes shall be drilled in the top of the pipe for injecting the sealing foam (i.e., Dow Chemical Company's Great Stuff Polyurethane Foam). One hole will be drilled at the location identified for the pipe to be cut. The other two holes shall be drilled approximately 4-in. on each side of the first. The foam will be injected into the two outer holes until foam pushes out of the center hole. The foam will then be allowed to set up.

6.3 Cutting and Capping

The pipes shall be cut at the identified location (approximately 6 in. from the AOC boundary, building wall, or tank). Caps (slip on flange with blind flange attached) shall then be placed over the ends and welded in place. Welding shall follow INEEL Welding Procedure Specification S2.0. In order to provide working room for installation of the end caps, a 12 to 18-in. section of pipe shall be removed utilizing the foaming procedures described above.

6.4 Disposal of Pipe Sections

The 12 to 18-in. sections of pipe removed during cutting and capping shall be categorized to the level and amount of contamination present. If investigation allows the debris to be disposed of at the INEEL CERCLA Disposal Facility (ICDF), then the 12 to 18-in. pipe sections will be packaged in 55-gal drums and disposed of in that manner. If the ICDF WAC cannot be met, then a "not yet determined alternative method" will be used for disposal. The pipe sections will be packaged in the appropriate containers depending on where final disposal takes place (ICDF, Envirocare, etc.). These containers will then be placed in interim storage at a CERCLA storage location at TAN until final disposition.

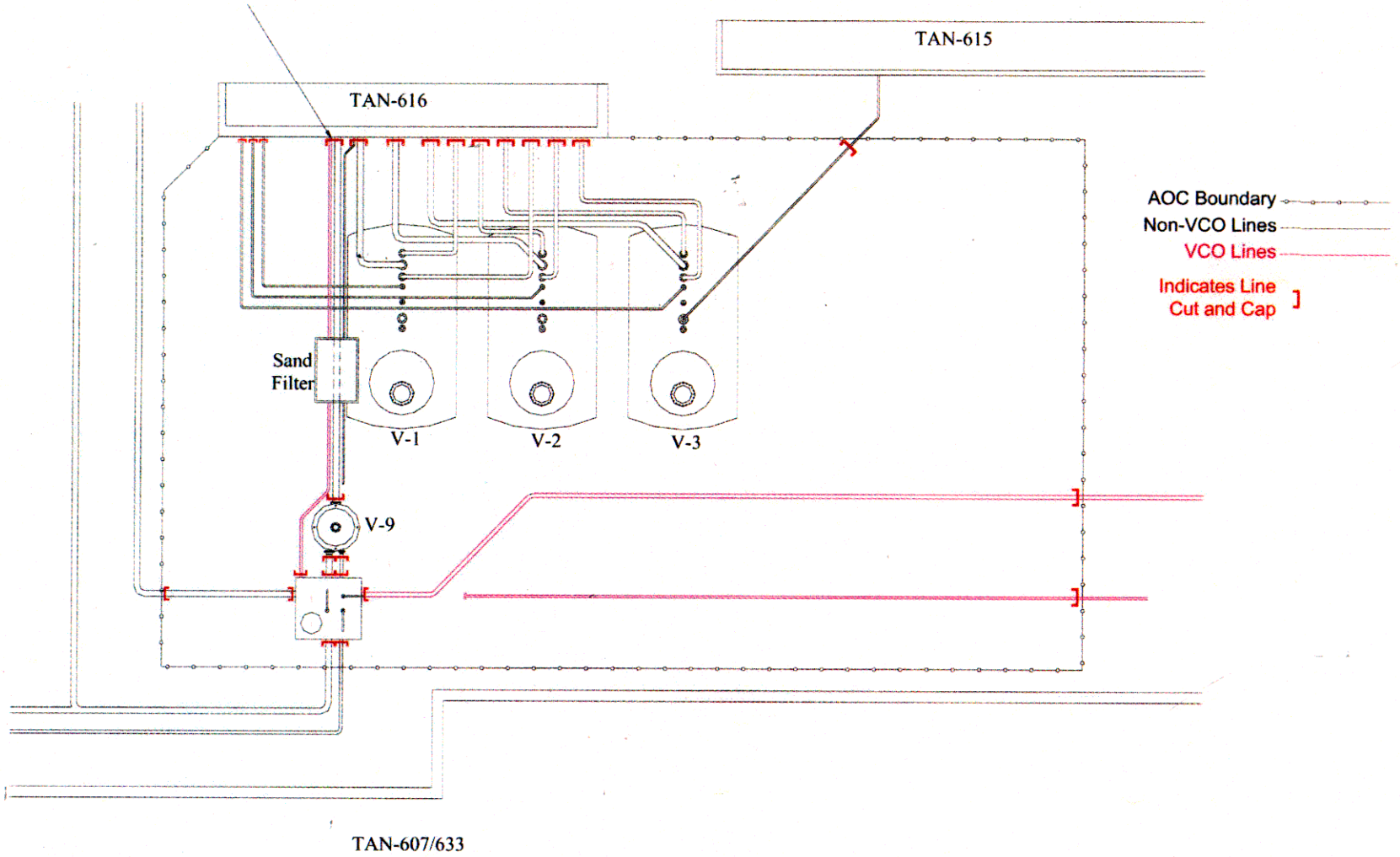

Figure 3. Cut and cap.

Disposal of entire pipe sections could be accomplished by cutting into lengths and placing in a 2 × 4 × 8 ft box and disposed of at the ICDF. However, better options may present themselves for disposal depending on the tank remedial action decided upon. Final decision shall be deferred until a remedial action decision has been made.

7. SAND FILTER

The sand filter is a concrete box and lid set on a concrete pad located on the surface between Tanks V-9 and V-1 (see Figure 2). No excavation will be necessary to gain access to the sand filter. All lines going into and coming out of the filter housing have been removed so that the filter housing is isolated from other components in the area. A review of the sand filter's structural integrity will be done to ensure that the box can be moved.

There are inlet and outlet pipes inside the box as well as a baffle. Also, a small amount of contaminated sand and debris still remain on the bottom of the filter box. This filter assembly will be removed from the AOC and disposed of either in a 4 × 4 × 8 ft container at the ICDF or shipped off-Site for disposal depending on analysis results concerning the ICDF WAC and land disposal restriction (LDR) levels.

8. PROCESS PROCEDURE

Figures 3 shows the piping in the AOC that has been identified to be cut and capped as well as the piping that will be isolated from the V-Tanks. Figure 3 shows some VCO lines being cut and capped. This isolation project will be run in conjunction with the TAN-616 VCO project in order to optimize overall efforts and reduce cost as much as possible. The current plan is to proceed following Management Control Procedure (MCP)-3562, "Hazard Identification Analysis and Control of Operational Activities," but further investigation of the applicability of using Standard (STD)-101, "Integrated Work Control Process," and a single work plan is highly desired. The proposed procedures in isolating the V-tanks and cutting the piping in preparation for pipe removal are as follows:

- Insert remote camera into the main drainage header pipe inside TAN-616.
- Inspect piping leading from V-9 and leading to Tanks V-1, V-2 and V-3 for standing waste liquid and the presence of residual contaminants.
- Excavate lines in vicinity where cutting and capping will occur.
- If video inspection determines flushing is needed, perform flushing operations as needed.
- Perform remaining isolation operations.
- Containerize any piping that needs to be removed.
- Store containerized piping in approved CERCLA storage area.
- Backfill all trenches.

9. REFERENCES

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